

CLAIMS

1. A screw pump, comprising:

5 a pair of screw rotors having teeth which are held in mesh with each other for drawing and discharging a fluid by rotating said screw rotors synchronously in opposite directions, said teeth of said screw rotors having the same shape as each other and being coiled helically in opposite directions;

10 wherein said teeth of said screw rotors have an axial tooth profile which allows a pair of facing teeth surfaces of said screw rotors to be brought into contact with each other only at a pitch line when said pair of facing teeth surfaces are brought into contact with each other.

15 2. A screw pump according to claim 1, wherein said axial tooth profile comprises an outer circumferential section, a tooth root section, and two interconnecting sections for interconnecting said outer circumferential section and said tooth root section, said outer circumferential section and said tooth root section are located apart from said pitch line by a substantially equal distance, respectively, and one of said two interconnecting sections comprises an inclined-line which inclines with respect to a direction perpendicular to an axial direction of said screw rotor in such a manner that a tooth width of said screw rotor becomes smaller from said tooth root section toward said outer circumferential section.

30 3. A screw pump according to claim 2, wherein a gradient of said inclined-line in a region from said pitch line to said outer circumferential section is larger than a gradient of said inclined-line in a region from said tooth root section to said pitch line.

4. A screw pump according to claim 3, wherein said teeth of said screw rotors have a transverse tooth profile including a trochoid curve generated by a point on an outer circumferential surface of said screw rotor at companion side, or a curve similar to said trochoid curve, and the other of said two interconnecting sections corresponds to said trochoid curve or said curve similar to said trochoid curve.

5. A screw pump according to any one of claims 1 to 4, further comprising:

a pair of rotating shafts to which said screw rotors are fixed; and

a pair of magnet rotors attached to said rotating shafts; wherein said magnet rotors have the same number of magnetic poles as each other, and said magnet rotors are arranged such that unlike magnetic poles of said respective magnet rotors attract each other.

6. A screw pump according to claim 5, further comprising: plural-phase armatures having cores and windings and being disposed radially outwardly of at least one of said magnet rotors; wherein at least one of said magnet rotors is driven by switching currents flowing to said armatures so that said screw rotors are rotated synchronously in the opposite directions.

7. A screw pump according to any one of claims 1 to 4, further comprising:

a pair of rotating shafts to which said screw rotors are fixed; and

plural pairs of magnet rotors attached to said rotating shafts;

wherein said magnet rotors have the same number of magnetic poles as each other with respect to each pair of said magnet

rotors, and said plural pairs of said magnet rotors are arranged such that unlike magnetic poles of said respective magnet rotors attract each other.

- 5 8. A method of operating a screw pump having a pair of screw rotors whose teeth have the same shape as each other and are coiled helically in opposite directions, comprising:
- bringing a pair of facing teeth surfaces of said screw rotors into contact with each other only at a pitch line; and
- 10 rotating said screw rotors synchronously in opposite directions so as to draw and discharge a fluid.